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Optical recording medium.

(5) An optical recording medium is disclosed, comprising a support having provided thereon a recording layer containing a naphtholactam due represented by formula:

$$R - N = C + CH = CH + \frac{1}{m}K$$

$$A = Z$$

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wherein K represents a substituted or unsubstituted aromatic amine residue; R represents a substituted or unsubstituted according group, a substituted or unsubstituted aryll group, or a substituted or unsubstituted allyl group; Z- represents an anion; ring A represents a substituted or unsubstituted or unsubstituted or unsubstituted or unsubstituted or unsubstituted or unsubstituted allyl group; Z- represents an anion; ring A represents a substituted or unsubstituted or unsubst

OPTICAL RECORDING MEDIUM

This invention relates to an optical recording medium. More particularly, it relates to an optical recording medium whose recording layer has a high reflectance and can be formed easily.

Optical recording media using a laser beam, etc. including laser discs are capable of recording and preserving informations at high densities and reproducing the recorded informations easily.

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Laser discs generally comprise a disc base having provided thereon a thin recording layer, on which a laser beam condensed to a diameter of about 1 μ m is irradiated to carry out high-density recording. Upon absorption of energy of the irradiated laser beams, the recording layer undergoes thermal changes, such as decomposition, evaporation, dissolution, and the like to thereby make a difference in reflectance between the irradiated areas and the non-irradiated areas. Reproduction of the recorded informations can be carried out by reading the difference of reflectance.

Therefore, in order to effect high-density recording and precise reproduction, optical recording media are required to show efficient absorption of a laser beam having a specific wavelength used for recording and to highly reflect a laser beam having a specific wavelength used for reproduction.

Various structures are known for this type of optical recording media. For example, Japanese Patent Application (OPI) No. 97033/80 (the term "OPI" as used herein refers to a "published unexamined Japanese patent application") discloses a support having provided thereon a single layer of phthalocyanine dyes. However, phthalocyanine dyes have disadvantages, such as low sensitivity, high decomposition points which lead to difficulty in vacuum deposition, and very low solubility in organic solvents which lead to difficulty in coating for formation of the recording layer.

Japanese Patent Application (OPI) Nos. 83344/83 and 22479/83 disclose phenalene dyes and naphthoquinone dyes, respectively, to be coated as a recording layer. These dyes, though easy to evaporate in vacuo, show low reflectances. Low reflectances result in poor contrast in reflectance between the recorded areas and non-recorded areas, thus making it difficult to reproduce the recorded informations.

In addition, Japanese Patent Application (OPI) Nos. 24692/84, 67092/84, and 71895/84 disclose recording layers comprising cyanine dyes. The cyanine dyes have an advantage of easy coating but are inferior in light resistance and undergo deterioration due to light for reproduction.

One object of this invention is to provide an optical recording medium whose recording layer can be formed by coating easily.

Another object of this invention is to provide an optical recording medium whose recording layer has a high reflectance to provide a satisfactory contrast of recording.

A further object of this invention is to provide an optical recording medium having excellent resistance to light, particularly light for reproduction.

As a result of extensive investigations, it has now been found that the above objects can be accomplished easily by providing a recording layer containing a naphtholactam light-absorbing dye having a specific chemical structure.

The present invention relates to an optical recording medium comprising a support having provided thereon a recording layer containing a naphtholactam light-absorbing dye represented by formula (I):

$$R - N = C \left\{ CH = CH \frac{1}{7m} K \cdot Z^{-} \right\}$$

$$A$$

$$A$$

wherein K represents a substituted or unsubstituted aromatic amine residue; R represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted alkyl group; Z⁻ represents an anion; ring A represents a substituted or unsubstituted naphthalene ring; and m represents 1 or 2.

In formula (I), substituents for the alkyl, cycloalkyl, aryl or allyl group as represented by R include an alkoxy group, an alkoxyalkoxy group, an alkoxyalkoxy group, an allyloxy group, an aryloxy group, a cyano group, a hydroxyl group, a tetrahydrofuryl group, a halogen atom, etc.

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Substituents for the naphthalene ring as represented by ring A include a halogen atom, a cyano group, a thiocyanate group, an alkyl group having up to 10 carbon atoms, an alkylamino group, an acylamino group, an amino group, a hydroxy group, and a like nonionic substituent.

The substituted or unsubstituted aromatic amine residue as represented by K include residual groups of heterocyclic amines containing a nitrogen atom, an oxygen atom or a sulfur atom, residual groups of tetrahydroquinolines, and groups represented by formula:

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$$- \bigvee_{x}^{Y} N \bigvee_{R^3}^{R^2}$$

wherein X and Y each represents a hydrogen atom, an alkyl group, an acylamino group, an alkoxy group, or a halogen atom; and R² and R² each represents a hydrogen atom, a substituted or unsubstituted alkyl group having up to 20 carbon atoms, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkyl group, or a substituted or unsubstituted cycloalkyl group.

Substituents for the alkyl, aryl, allyl or cycloalkyl group as represented by R² or R³ include an alkoxy group, an alkoxyalkoxy group, an alkoxyalkoxy group, an alyloxy group, an aryl group, an aryloxy group, a cyano group, a hydroxyl group, a tetrahydrofuryl group, etc.

Anions represented by Z^{-} include I^{-} ,

Br, Cl, Clo₄, Br₄, SCN, CH₃-
$$\bigcirc$$
-SO₃,

$$(CH_{\frac{1}{2}})_{2}N$$

$$S$$

$$N(CH_{\frac{1}{2}})_{2}$$

$$N(CH_{\frac{1}{2}})_{2}$$

$$(H_5C_2)_2N$$
 S
 N_1
 S
 $N(C_2H_5)_2$

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The naphtholactam dyes represented by formula (I) absorbs light in the wavelength region of from 600 to 900 nm and have a molecular absorption coefficient of from 104 to 105 cm⁻¹.

Among the naphtolactam dyes of formula (I), the preferred are those represented by formula (II):

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$$R^{1} - N = C + CH = CH \rightarrow M$$

$$R^{2} - Z - (II)$$

$$R^{3}$$

wherein X and Y each represents a hydrogen atom, a halogen atom, an alkyl group, an acylamino group, or an alkoxy group; R¹ represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted alkyl group having up to 20 carbon atoms, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkyl group, or a substituted or unsubstituted alkyl group, or a substituted or unsubstituted cycloalkyl group; R⁴ and R⁵ each represents a hydrogen atom, a halogen atom, a cyano group, a thiocyanato group, an alkyl group having up to 10 carbon atoms, an alkylamino group, an acylamino group, an amino group, or a hydroxyl group; Z⁻ represents an anion; and m represents 1 or 2.

In formula (II), substituents for the alkyl, aryl, allyl, or cycloalkyl group as represented by R² or R³ include an alkoxy group, an alkoxyalkoxy group, an allyloxy group, an aryl group, an aryloxy group, a cyano group, a hydroxyl group, a tetrahydrofurfuryl group, a halogen atom, etc. In the definition of the residues in formulae I and II the terms "alkyl" and "acyl", whether used alone or as part of other groups including alkoxy, alkylamino, acylamino etc., preferably refer to groups having up to 20, more preferably up to 10 carbon atoms unless otherwise stated. In a similar way the terms "cycloalkyl" and "aryl" preferably refer to groups having up to 10 carbon atoms. The term "halogen" refers to fluorine, chlorine, bromine and iodine atoms.

The more preferred of the naphtholactam dyes of formula (II) are those represented by formula (III):

$$R^{1} - N = C + CH = CH \rightarrow M$$

$$R^{2} \cdot Z^{-} \text{(III)}$$

wherein X represents a hydrogen atom or a methyl group; R¹ represents an alkyl group having up to 8 carbon atoms, and preferably up to 5 carbon atoms, an alkyl group having up to 8 carbon atoms, and preferably up to 5 carbon atoms, which is substituted with an alkoxy group, preferably the one having up to 4 carbon atoms, an allyloxy group or a hydroxyl group, or an allyl group; R² and R³ each represents an alkyl group having up to 8 carbon atoms which is substituted with an alkoxy group, preferably the one having up to 4 carbon atoms, an alkyl group, preferably the one having up to 4 carbon atom, or an allyloxy group, a hydroxyl group or a halogen atom, or an allyl group; R¹ represents a hydrogen atom, a halogen atom, preferably a chlorine atom or a bromine atom, or a thiocyanate group; Z⁻ represents an anion; and m represents 1 or 2.

The naphtholactam dyes represented by formula (II) can easily be prepared by condensing a compound represented by formula:

$$R^{1} - N = C - CH_{3}$$

$$R^{4}$$

wherein R^1 , R^4 , R^5 , and Z^- are as defined for formula (II), with an aromatic aldehyde represented by formula:

OHC — CH = CH
$$\rightarrow$$
 \mathbb{R}^2

wherein X, Y, R2,R3, and m are as defined in formula (II).

The naphtholactam dyes of formula (II) can also be prepared by reacting a compound represented by formula:

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$$R^{1} - N = C + CH = CH + M$$

$$R^{2}$$

$$R^{3}$$

$$R^{4}$$

$$R^{5}$$

wherein R^1 , R^2 , R^3 , R^4 , R^5 , X, Y, and m are as defined above; and Z⁻ represents I⁻, Br⁻, CI⁻, CIO₄⁻, BF₄⁻, SCN⁻, PF₆⁻, SiF₆⁻, TiF₆⁻,

with a compound represented by formula: $Q^- \bullet X^+$ wherein Q represents

$$(CH_3)_2N$$

$$S = N_1 S$$

$$N(CH_3)_2$$

$$(H_5C_2)_2N$$
 S
 NI
 S
 $N(C_2H_5)_2$

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or

and X* represents a tetraalkylammonium cation, etc., in a polar solvent under heating with stirring.

The optical recording medium according to the present invention essentially comprises a support and a recording layer and, if desired, may further comprise a subbing layer on the support and a protective layer on the recording layer.

The support to be used may be either transparent or opaque to a laser beam used. Any of supports usually employed for this type of recording media, such as glass, plastics, paper, metal plates or foils, etc., may be used, with plastics being preferred from various respects. The plastics to be used include acrylic resins, methacrylic resins, vinyl acetate resins, vinyl chloride resins, nitrocellulose, polyethylene resins, polypropylene resins, polycarbonate resins, polyimide resins, polysulfone resins, and the like.

The recording layer of the optical recording medium of the invention has a thickness of from 100 Å to 5 μ m, and preferably from 500 Å to 3 μ m.

The recording layer can be formed by a commonly employed thin film formation techniques, such as a vacuum deposition process, a sputtering process, a doctor blade coating process, a casting process, a spinner coating process, a dip coating process, and the like.

In the formation of the recording layer, a binder may be simultaneously used in a naphtholactam type light absorbing dyes. Usable binders include polymers, such as polyvinyl alcohol, polyvinylpyrrolidone, nitrocellulose, celloluse acetate, polyvinyl butyral, polycarbonate, etc. The recording layer preferably contains at least 1% by weight of the naphtholactam dye based on the polymer binder.

In the case of coating the recording layer by the above-described doctor blade coating process, casting process, spinner coating process, dip coating process, and the like, and particularly spinner coating process, a solvent for coating is employed. Suitable solvents to be used include those having a boiling point of from 120° to 160°C, e.g., bromoform, dibromoethane, tetrachloroethane, ethyl cellosolve, xylene, chlorobenzene, cyclohexanone, etc. In the case of film formation by the spinner coating process, a rotational speed preferably ranges from 500 to 5,000 rpm, and the spin-coated layer may be heated or treated with a solvent vapor, if necessary.

For the purpose of ensuring stability or light resistance of the recording layer, the recording layer may contain, as a singlet state oxygen quencher, a transition metal chelate compound, e.g., acetylacetonato chelates, bisphenyldithiol, salicylaldehyde oxime chelates, bisdithiol-α-diketone, etc.

The recording layer according to the present invention may further contain other dyes in addition to the naphtholactam dyes of formula (I), such as naphtholactam dyes other than those of the present invention, indophenol dyes, triarylmethane dyes, azo dyes, cyanine dyes, squalilium dyes, etc.

The recording layer of the optical recording medium according to the present invention may be provided on either a single side or both sides of a support.

Recording on the optical recording medium of the invention can be performed by irradiating the recording layer provided on one or both sides of the support with a laser beam, and preferably a semiconductor laser beam, condensed to a diameter of about 1 μ m. The laser irradiation induces thermal deformation of the recording layer due to energy absorption, such as decomposition, evaporation, melting, and the like, to thereby effect recording.

Reproduction of the thus recorded information can be carried out by irradiating a laser beam to read a difference in reflectance between the area where such a thermal deformation has taken place and the area where no thermal deformation has taken place.

The laser beams which can be used for recording and reproduction include laser beams of N₂, He-Cd, Ar, He-Ne, ruby, semiconductors, dyes, and the like. Of these, semiconductor laser beams are preferred in view of their lightweight, small size, and ease on handling.

This invention will now be illustrated in greater detail with reference to the following examples, but it should be understood that they are not intended to limit the present invention.

EXAMPLE 1

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Synthesis of Naphtholactam Dve:

To a mixture of 250 g of glacial acetic acid and 50 g of acetic anhydride were added 39.0 g of a compound of formula:

$$H_5^{C_2} - N = C - CH_3$$

and 19.1 g of a compound of formula:

OHC
$$-N$$
 $C_2^{H_5}$
 $C_{13}^{H_5}$

and the mixture was heated at 100 to 105° C for 4 hours with stirring. After completion of the reaction, the reaction mixture was cooled to room temperature, and poured into 1.5 liters of water containing 16.0 g of sodium perchlorate, followed by stirring at room temperature for 8 hours. The formed crystals were collected by filtration and dried to obtain 45 g of a naphtholactam dye having the following formula as a dark green crystals. A chloroform solution of this dye showed a λ_{max} of 740 nm.

$$H_5C_2 - \frac{h}{N} = C - CH = CH - N$$
 C_2H_5
 C_2H_5
 C_2H_5

Production of Optical Recording Medium:

One gram of the naphtholactam dye as above prepared was dissolved in ethyl cellosolve, followed by filtration through a filter of 0.22 μ m. 2 ml of thus obtained solution was dropped on a substrate of polycarbonate resin disc having a diameter of 130 mm which had been grooved to a depth of 700 Å and a width of 0.7 μ m, and coated by a spinner at 800 rpm, followed by drying at 60°C for 20 minutes. For film thickness measurement, a glass plate was separately coated with the coating solution under the same conditions as above, and the film thickness was measured by means of Talystep (Rank Taylor Hobson KK) and was found to be 650 Å. The coated film exhibited its absorption maximum at a wavelength of 790 nm and a broad peak width.

When a semiconductor laser beam having a center wavelength of 830 nm and a beam diameter of 1 μ m was irradiated on the coated film at an output of 6 mW, clear-outlined pits having a width of about 1 μ m and a pit length of about 2 μ m were formed. The carrier level/noise level ratio (C/N ratio) of the pits was 52 dB. The coating film exhibited satisfactory light resistance and resistance to reproducing light.

EXAMPLE 2

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A naphtholactam dye of the formula shown below was synthesized in the same manner as described in Example 1. A chloroform solution of the dye had a λ_{max} of 740 nm.

$$NCH_4C_2 - N = C - CH = CH - CH_3$$
 C_2H_5
 C_2H_5

One gram of the naphtholactam dye thus obtained was dissolved in 50 g of dibromoethane, followed by filtration through a filter of 0.22 μ m. 2 ml of the resulting solution was dropped on a substrate of methyl methacrylate resin (hereinafter referred to as PMMA) disc having a diameter of 120 mm which had been grooved to a depth of 700 Å and a width of 0.7 μ m and coated by a spinner at 1200 rpm, followed by drying at 60°C for 10 minutes. The film thickness was measured in the same manner as in Example 1 and was found to be 700 Å. The coating film showed its absorption maximum at 790 nm with a broad peak width.

When a semiconductor laser beam having a center wavelength of 830 nm and a beam diameter of about 1 μ m was irradiated on the coated film at an output of 6 mW, clear-outlined pits having a width of about 1 μ m and a pit length of about 2 μ m were formed. The C/N ratio of the pits was 48 dB. The coating film showed satisfactory light resistance and resistance to reproducing light.

EXAMPLE 3

Synthesis of Naphtolactam Dye:

To 50 ml of N,N-dimethylformamide were added 6.48 g of a dye having formula:

$$H_{5}C_{2} - N = C - CH = CH - CH_{3}$$

$$C_{4}H_{9(n)}$$

$$C_{4}H_{9(n)}$$

and 6.20 g of a compound of formula

and the mixture was heated at 90 to 100° C for 3 hours. After cooling, the reaction mixture was poured into 300 ml of water, and the mixture was stirred at room temperature for 1 hour. The thus precipitated crystals were collected by filtration and dried to obtain 10.20 g of dark green crystals represented by the formula shown below. A chloroform solution of the product had a λ_{max} of 745 nm.

H₅C₂ -
$$\stackrel{+}{N}$$
 = C - CH=CH $\stackrel{-}{\searrow}$ - $\stackrel{-}{N}$ CH₅

CH₅

CH₅
 $\stackrel{+}{S}$ $\stackrel{-}{N}$ $\stackrel{-}{S}$ $\stackrel{-}{N}$ $\stackrel{-}{N}$ $\stackrel{-}{S}$ $\stackrel{-}{N}$ $\stackrel{-}{N}$

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Production of Optical Recording Medium:

One gram of the naphtholactam dye as above prepared was dissolved in 50 g of tetrachloroethane, and the solution was filtered through a filter of 0.2 µm. 2 ml of the resulting solution was dropped on a substrate of PMMA disc having a diameter of 130 mm which had been grooved to a depth of 700 Å and a width of 0.7 µm and coated thereon by a spinner at 800 rpm, followed by drying at 60°C for 20 minutes. The film thickness was measured in the same manner as in Example 1 and was found to be 700 Å. The coated film exhibited its absorption maximum at 790 nm with a broad peak width.

When a semiconductor laser beam having a center wavelength of 830 nm and a beam diameter of 1 μm was irradiated on the coated film at an output of 6 mW, clear-outlined pits having a width of about 1 μm and a pit length of about 2 µm were formed. The C/N ratio of the pits was 52 dB. The coated film exhibited satisfactory light resistance and resistance to reproducing light.

EXAMPLES 4 TO 95

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In the same manner as described in Example 1, naphtholactam dyes shown in Table 1 were synthesized. The wavelength of the absorption maximum of each of the resulting dye in its chloroform solution was as shown in Table 1.

Each of the resulting dyes was coated on a substrate of grooved polycarbonate resin disc in the same manner as in Example 1. The wavelength of the absorption maximum of the coating film was as shown in Table 1.

When a semiconductor laser beam having a center wavelength of 830 nm was irradiated on the coated film, clearly outlined pits were formed. The thus formed recording layer had a high reflectance, high sensitivity, and an excellent C/N ratio, and exhibited satisfactory light resistance and resistance to reproducing light.

5	٠.	A max (Good Ing	790	780	798	785	
10		λ max (1n CHCl.)	(nm) 740	735	745	745	
15		₹	7 -1	_ ⁴ 0x0	=	=	
20	×		1				
25 30	TABLE 1 Naphtholactam Dye R - N - C - C - K 1	A 3 B 3 C C C C C C C C C C C C C C C C C	$C_4^{H_9(n)}$	CH ₃	$\left\langle \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \right\rangle_{N} C_{4} \Pi_{9}(n)$ CH_{3}	$\left\langle \begin{array}{c} C_3^{11}, (n) \\ - C_3^{11}, (n) \\ C_3^{11}, (n) \end{array} \right\rangle$	(cont'd)
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		_ ==	9 7	=	=	3	
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		2	∮ =	=	=	=	
45		· •	f 7	=	=	=	
50 ⁻			-c ₂ H ₅	=	÷	=	
55		Example	4	۱n	vo	~	

5	F .						
	λ max (contling filling filling) 790	780	775	. 077	780	780	
10	(11) (CICCL3) (CICD) 745	740	735	730	735	735	
15	Cro ₄	=	z	=	£	Ξ	
20	-k \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	$\begin{pmatrix} c_{13} \\ c_{2} \\ c_{2} \\ c_{2} \\ c_{13} \end{pmatrix}$	C2H40C-CH3	$ \begin{array}{c} \begin{pmatrix} & & & & & & & & & & & & \\ & & & & & & &$	$\left\langle \begin{array}{c} C_4 H_9^{(n)} \\ \\ C_2 H_4 \stackrel{\text{OCOCH}_3}{\parallel} \end{array} \right\rangle$	CH ₃ CH ₃ (n)	
25						E S	
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	# F F F F F F F F F F F F F F F F F F F	2	=	=	=	=	၁
35	T# #	=	2	=	=	= -	
	-A -Br	=	=	=	=	=	
40	1 4 2 H	=	=	3	=	=	
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50	-R -C ₂ H ₅	= ·	=	2	=	=	
•	Example No.	o n	01	=	12	13	

5	λ max (centing film) (nm)	760	780	775		765	780	
10	λ max (in CICL 3 (nm)	720	740	7.15	7.35	725	740	
15	12	_ [†] 070	=	=	=	=	:	
20	, X	$\left(\sum_{c_2 u_4 \in N} c_N \right)$	$\left\langle \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right\rangle^{N} \left\langle \begin{array}{c} c_4 H_9(n) \\ \\ c_2 H_4 o c_2 H_4 o c H_3 \end{array} \right\rangle$	$\left\langle \begin{array}{c} C_4 H_g(n) \\ - \\ - \\ C_2 H_4 O \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\$	$\begin{pmatrix} & & & & & & & & & & \\ & & & & & & & & $	$C_4^{H_9(n)}$ C_{H_2}	$\left\langle \mathbf{c_{4^{11}9}^{(n)}} \right\rangle$	
25			E E	CH 3	E 3	Sill Sill Sill Sill Sill Sill Sill Sill		
30	-103	F	=	=	=	=	=	(cont'd)
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35	-8-	Ŧ	=	=	=	=	=	
40	-A3	-8r	z	=	=	=	=	
	-A2	Ŧ	Ξ	=	=	=	=	
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50	%	-C ₂ H ₅	z.		=	=	=	
55	Example No.	4	21	91	71	18	61	

5	λ κικ (σαιτίαη (πm)	775	780	775	, ,	820	
10	ארש ל מו) ' (בוסוט ' (תוח)	735	740	735	765	780	
15		C 10 4	2	=	=	=	
20	-k H _q (n)	$C_{2}H_{4}O\left(\frac{1}{L}\right)$ NO ₂	CH ₂	$\sum_{c_2 u_4 o_4} \sum_{c_4 v_5 o_4} c_4 c_5$	# S # S	_vv.	
25	3		Single Si			NICCOCII 3	
30	- R 3	Ŧ	=		=	=	(cont'd)
35	- B 2	₹	z	=	=	Ξ	
	- n :	-	=	=	=	=	
40	- Y	i ,	=	=	=	=	
	- A -	=	=	=	=	=	
4 5	- Y -	·	=	=	=	=	
50	4 c	25		.	=	=	
55			21	22	. 53	24	

5	λ max (coating film) .(mm)	800	845	815		760	770	
10	λ max z (in Ci(ζ) ₁)	760	000	770	715	725	735	
15	z - z	C204_	' _H	=	=	Ξ	=	
20	¥	2 ^H 5 2 ^H 5	c ₂ H ₅	2 ^H 5 2 ^H 5	6 ^H 13 ⁽ⁿ⁾ 6 ^H 13 ⁽ⁿ⁾	(u) ⁶ 4,	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array}\\ \end{array} \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \begin{array}{c} \end{array}\\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array}$	
25	Č	NICOCHI	OCH 3 C2H NHCOCH 3	COH ₃ C ₂ H ₅ COH ₃	Ch 13(n)	$\begin{array}{c c} & c_{4} & 0 & c_{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & $	S S S S S S S S S S S S S S S S S S S	•
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	m	Ŧ	2	=	=	=	=	
40	4.	18 18	=	=	=	=	=	
	-42	Ŧ	=	=	=	=	= .	
45	-4	Ŧ	=	=	=	=	=	
50	n	-62H5 -	. =	: .	=	=	=	
55	Example No.	25	56	27	28	29	30	

5	λ max (conting) film)	755		770	770 .	062	
10	λ max (in cyc). γ (in <u>γ</u>).	735	735	735	735	750	
15	22	1_	=	n n	Ξ	=	
20	¥	_c ₂ H ₅ _c ₂ H ₄ NH ₂	~c ₂ H ₅ `c ₂ H ₄ [®] N−(cH ₃) ₃ I ^Θ	C ₂ H ₅	C2H5	2,4 5	
25		GE 3	E S		E E	\	
30	-B3	Ŧ ·	=	3	=	z	(cour,q)
	-B2	7	=	=	=	=	
35	- B	Ŧ	=	=	=	=	
40	- P	ង	=	=	=	Ξ	
	-A2	Ŧ	=	=	=	=	
4 5	- v	Ŧ	=	=	=	±	
50	a.	-c ₂ H ₅	=	=	=	=	
65	Example No.				34	35	

5	λ μτιχ (conting) f.llm) (nm) 780	785	785	,	795
10	λ πειχ (1η C!κCl ₃) (nm) 74.0	745	745	760	755
15	z z z	=	=	:	By 4
20	-K -N -C, H 9 (n)	C8H17(n)	_c3H ₇ (1)	c ₂ H ₅	c ₂ H ₅
25	N S S S S S S S S S S S S S S S S S S S	S S S S S S S S S S S S S S S S S S S	CH ₃	NIICOOCH 3	$\left\langle \begin{array}{c} C_2^{H_5} \\ - \\ - \\ NISO_2^{GH_3} \end{array} \right\rangle$
30	# PP	=	=	=	" " (cont'd)
35	1 ^H H	=	=	=	=
	- = +	=	=	:	=
40	-43	=	=	=	=
	-A ²	=	=	=	=
45	- H -	z	=	=	:
50	-R -A1	Ξ	=	=	=
56	Example No.	37	38	39	07

5	λ max (ccnt.lny fllm) (nm)	780	780	780	785	780	. 277	780	790	790	790	
10	A max A (In (sec) 3.	740		745						740	740	
15		n 4 -	=	:	Ξ	Ξ	=	-so3-	=	=	Ξ	
20	¥	$\left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} 2^{11} \\ \\ \\ \end{array} \right\rangle_{C_{2}H_{5}}$	= .	=	Ξ	=	=	=	=	=	=	
25	1 1 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	₹ 7	=	=	Ξ	=	, =	=	=	=	=	
30	-B ²	₹ .	=	=	1=	=	=	= .	Ξ	=	<u>=</u>	(cont'd)
	=	· 7	=	=	=	= /	=	=	=	=	=) (co
35	-A3	- Br	=	=	Ξ	=	. =	=	=	=	=	
	-A ²	7	=	=	=	=	=	=	=	=	=	
40	-A-	7	=	=	=	=	=	=	=	=	=	
4 5	88.1	-C ₃ H ₇ (n)	-c ₅ H ₁₁ (n)	-cH ₂		-c ₂ H ₄ ocH ₃	$-c_{\rm H_2}c_{\rm H_2}c_{\rm H_3}$	-c ₃ H ₇ <->	-c ₂ H ₄ o	-с ₂ н ₄ ос ₂ н ₄ осн ₃	$-c_2 H_4 o c_2 H_4 o c_2 H_4 o c H_3$	
55	Example No.	41	42	43	77	45	46	47	87	67	20	

5	λ mnx (scarting) [f.tlm) (mm) 785	785	. 062	780	780	785	. 077	775	780	
10	A max (4m) CICL ₃) (nm)	745	740	740						
15	z	Ξ	=	_, 	=	SCN_	=	=	=	
20	-k	=	=	=	=	2	=	Ξ	=	
25	H H C	=	=	=	=	=	=	=	=	
30	- FB .	Ξ	=	=	, :	=	=	. =	=	(cont¹d)
	- = =	=	=	=	=	=	=	=	=	g)
35	- Br	=	=	=	=	=	=	=	7	
	-42 -H	=	=	:	=	Ξ	=	=	=	
40	- * #	=	2	=	=	=	±	=	æ	
45	-c ₂ H ₄ och ₂ cH=CH ₂	-ch₂ch-ch₂	н	-c ₂ H ₄ ocH ₂ cH≖cH ₂	-c ₂ 11 ₄ 011	-с ⁵ н [†] ск	-cH ₂ H	-c ₂ H ₄ cN	=	
55	Example No.	52	53	54	55	56	57	58	59	

5	A max (cca.t. fry F.11 m) (nm)	760	785	780	077	275	
10	A max (din CIR.11 ₃) (min)	745	745	740	072	745	
15	SCN_	_ [*] 0*0	Ξ	GH ₃ () SO ₃	~	- so	
20	10.10	(u)	1 (n)				
25	Ch, Co, H, Co, H	$\bigcup_{C_{1}}^{3} \bigvee_{C_{4}}^{C_{4}H_{9}(n)}$	$ \left\langle $	C2H5	GH ₃ C ₂ H ₅	=	
30	-i- -i-3	= .	=	æ	=	=	(cont'd)
	- EB	=	=	2	=	=	J
35	-	=	=	=	=	=	
40	CH ₃	7	=	2. CEI 3	7 0-	- 181 - 181	
	-4 -11	=	, =	Ξ	=	=	
45	- 	=	=	=	=	1 1 1	
50	-R -A1	=	=	-c ₂ H ₅	=	=	
55	Example No:	19	. 62	63	79	6.5	

5	A max (caalding Fillin)	790	795	. 062		800
10	λ max (in CHCl ₃ .	750	760	760	780	760
15	-2	- c so -	=	C 20 04	=	=
20		.2"5 .2 ^H 5		GH ₃	CH ₃	n /
25	¥	CH ₃	. EH-	C-1245		
30	-103	₹	=	=	=	" (cone'd)
35	-B ¹ -B ²	7	=	=	=	=
40	-A ³	-0CH ₃	-NIICH 3	រ. ជា 1	=	=
	-A2	¥ ĭ	=	=	=	=
45	-A-	푸 -	=	=	=	=
50	<u>ح</u> ا	-c ₂ H ₅	=	=	=	:
	Exumple No.	. 99	67	89	69	70

5							
10	(In conlint) (Hi conlint) (HOI) (HOI)	815	810	воо	790		
	(in CHCl ₃)	785	785	770	740	755	
15	7	_ [*] 070	=	=	=	=	
20	¥	(n) ₉ ^H	√инс ₄ н ₉ (n) ∕	CII3 CN N NHC4Hg(n)	C4H9(n)	Cl. 3 Cl. 3 Cl. 3 Cl. 3 Cl. 4 Col. 3 Cl. 4 Col. 3 Cl. 4 Col. 3 Cl. 4 Cl. 3 Cl. 4 Cl. 5 Cl.	
25		-NHC4H9(n)	NHC,	H ₅ C ₂ HN		2	(p,:
30	- B3	Ŧ	= .	=	=	Ξ	(cont'd)
	- B 2	7	=	=	=	=	
35	-81	7	=	=	=	=	
40	2 -A ³	181	=	2	=	=	
	- Y	7	=	=	.	=	
4 5	- Y-	Ŧ	=	=	=	=	
	4	-C ₂ H ₅	 =	=	=	=	
50	Example No.	1.7	. 22	73	74	25	

5	λ max (ccvaLing (f.11m) (nm)	805	795	810	805	ноо	
10	A max (in circl)	277	755	775	775	755	
<i>1</i> 5	-2	Cro,	=	=	£	, "Socii3	
20	K H	CH3 CH4 CH3	$\begin{pmatrix} c_{L}^{H} \\ c_{S}^{L} \end{pmatrix}$	-инс ₂ н ₄ он	~NIIC2 II40C2 II40II	CII3 CN CN NIIC3116 OCH3	
25		. H. 35°	- 20°	NIHO	MHC		(cont'd) ·
30	- B 3	Ξ.	=	:	<u>.</u>	÷ .	(cont
35	-B ¹ -B ²	₹	= =	=	=	=	
40	-A 3	n:	1 10	-Mi ₂	-NIIC2 II 5	-MICOCH ₃	
4 5	-A2	7	=	=	=	=	
	-A-1	干	=	=	3	=	
50	44 44	-c ₂ 115	=	=	=	=	
55	Example No.	76	7.7	78	79	80	

5	λ max λ max (in (coating) (film) (mm) (nm) 74.0 770	780	H20	077	800	
10	λ max (4n) GKC1;) (mm) 740	750	780	750	775	
	CkO 4	Ξ	=	=	=	
15	1				-	
20	-K /N C ₂ H ₅	CH ₃ -N -N -CH ₃ -N -CH ₃ -N -CH ₃	C2H40H33	C ₂ n, on	-NIIC ₂ II ₄ OCII ₃	
25	Z). 			-
30	. = 1 B3	=	=	₹ .	Br	(cont'd)
	- IB - IB	=	=	Ξ	=	
35	#	- <u>:</u>	=	<u> </u>	=	
40	-A3 -N COCH3	រពិ	=	= .	: .	
4 5	-A ²	=	=	=	=	
	H H	=	14 60 1	=	· =	
50	-C ₂ H ₅	=	=	=	=	
55	Example No. 81	82	83	. 48	85	

5	max	805		780	780	077	765	
10		375	755	740	748	745	740	
15	z z	Cro4	=	=	SCN_	=	= .	
20		зн ₃	CH ₃	:	લ લ	(u)		
25	¥ 	NHC2H,OCH3	СР Н3 СОН 4 С2 НИ N-1	$\left \frac{1}{s}\right _{N}\left c_{2}^{H_{5}}\right $	$\left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle = \left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle \left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle \left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle \left$	$\left\langle \begin{array}{c} C_3 H_7(n) \\ - \\ C_3 H_7(n) \end{array} \right\rangle$	$\left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle = \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle = \left\langle \begin{array}{$	
30	£83	rg -	-c ₂ H ₅	. 7	=.	٠ :	=	(cont'd)
35	- B2	Ŧ	=	Z	=	=	=	
	-u-	-Br	=	Ŧ	=	=	=	
40	-A3	-cII ₃	-c ₂ H ₅	Ŧ	-S CN	:	Ξ	
	-A2	7	=	=	=	=	=	
45	-4	H H I	=	7	=	=	=	
50	æ. 1	-c ₂ II ₅	=	=	=	±	=	
55	Example No.	99	87	88	68	06	16	

. 5	λ max λ max (in (conting) CICL ₃) ΓΙΙ m) (nm) (nm)	780	780	780	780
10			748	750	750
15	-2	SCN	PF -	SiF ₆	TiF6
20	. ×	$\begin{pmatrix} & & & & & & & & & & \\ & & & & & & & & $	= -	=	=
25	1	r			
30	-B ² -B ³	Ŧ .	=	=	•
35	-81	H-	=	=	=
40	-43	-Br	=	=	=
	-A 2	Ŧ	=	=	=
45	-A-	Ŧ	=	=	=
50	<u>د</u> ا	-C ₂ H ₅ -H	=	=	=
55	Example No.	. 26		76	95

0 224 261

EXAMPLES 96 TO 184

In the same manner as described in Example 3, naphtholactam dyes shown in Table 2 were synthesized. Each of the resulting naphtholactam dyes was coated on a substrate of grooved PMMA disc in the same manner as in Example 1 to form a coated film. The wavelength of the maximum absorption of the coated film was shown in Table 2.

When a laser beam having a center wavelength of 830 nm was irradiated on the coated film, clearoutlined pits were formed. The coated film had a high reflectance, high sensitivity, and an excellent C/N ratio and exhibited satisfactory light resistance and resistance to reproducing light.

		λ max (ccating film) (mm)	740	740	780	790	
		. 2	H ₃ C (III ₃) (III ₃) (III ₃)	Ξ	=	=	
TABLE 2	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	-B ³ -K	$-H \xrightarrow{\text{CH}_3} C_4^{\text{H}_9(n)}$		" CH ₃ CH ₃	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(cont'd)
		-B ²	F	=	=	. =	
	9 1	-B-	Ŧ	=	=	=	
	cam Dy	-A3	n Br	Ŧ	B	=	
	olact	-A2	7	=	=	=	
•	Naphtholactam Dye	-A-	Ŧ	=	=	=	
		R R	-C ₂ H ₅	-c ₂ H ₄ cN	-c ₂ 11 ₅ .	=	
	·	Example No.	96	- 6	86	66	

5	Coating	785	790	780	775	770	
J	.	CIII 3					
10		Ni S					
15	_ Z	H ₃ C S S S S S S S S S S S S S S S S S S S	=	Ξ	Ξ	=	
20 _		=	-				•
25	¥		$\left\langle \left\langle c_{4}^{2}\right\rangle \right\rangle \left\langle \left\langle c_{4}^{2}\right\rangle \left\langle c_{4}^{2}\right\rangle \left\langle \left\langle c_{4}\right\rangle \left\langle c_{4}\right\rangle \left\langle c_{4}\right\rangle \left\langle \left\langle c_{4}\right\rangle \left\langle \left\langle c_{4}\right\rangle \left\langle c_{4}\right\rangle \left\langle \left\langle c_{4}\right\rangle \left\langle c_{4}\right\rangle \left\langle c_{4}\right\rangle \left\langle \left\langle c_{4}\right\rangle \left\langle c_{4}$	$C_{2^{11}4^{OCH_3}}$	$\left\langle -\frac{c_4 \mu_9(n)}{\sum_{2}^{L_4 0CCH_3}} \right\rangle$	$C_{2^{11}4}^{C_4^{11}9}^{(n)}$	(P,:
30		E E		\$ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			(cont'd)
35	-B3	Ŧ	Ξ	=	Ξ	=	
	-B ²	₹	=	=	2	=	
40	-B-	Ŧ	=	=	=	=	
	- A 3	Br r	=	=	=	=	
45	-A2	Ŧ	=	=	=	=	
£0	-A-	Ħ T	=	=	=	=	
50	<u>ب</u> ا	-c ₂ H ₅	=	=	=	Ξ	
55	Example No.	100	101	102	103	104	

	A mux (couting (film)	(nm) 780	780	760	780	27.5	775	
	_ 2	Ni S CIII 3	3	=	z		=	
	2	H ₃ C				-	-	
	X-	$c_{4^{11}9}^{c_{4^{11}9}(n)}$	C4119 (n)	$\left\langle c_{4}^{49}(n)\right\rangle$	C21140C21140C113	$\begin{pmatrix} c_4 \mu_9(n) \\ c_2 \mu_4 o \end{pmatrix}$	$\begin{array}{c} \begin{array}{c} c_{4} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \end{array} \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ $	(cont'd)
	-	E S	ST ST	E E	E S	ÇJ _E	E C	ō)
	-B ³	Ŧ	=	=	=	:	=	
	-B ²	₹	z	=	Ē	z	=	
	-a-	7	=	=	=	=	=	
	-A3	# #	z	=	=	=	=	
	-A ²	Ŧ	=	=	=	:	=	
	-A-	Ŧ	=	=	=	=	=	
ť	æ	-с ₂ н ₅ -н	2	Ξ	=	=	Ξ	
ŧ	Example No.	105	106	107	108	109	110	

λ max (conting film)	765	780	775	780	175	800	
_ 2	H ₃ C S - S - CII ₃	Ξ		=	=	Ξ	
, Y	CH_{3} CH_{3} CH_{2} CH_{3}	$C_{13}^{\text{C}_4H_9(n)}$	$\left\langle \begin{array}{c} C_4^{H_9(n)} \\ \\ C_2^{H_4} \\ \end{array} \right\rangle^{-N_0}$	CH_3	$\left\langle \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right\rangle - N \left\langle \begin{array}{c} c_4 H_9(n) \\ \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle - C_4 \left\langle \begin{array}$	CH3 C2H5	(cont'd)
-B ³	Ŧ	z	=	=	= -	=	
-B ²	Ŧ	=	=	=	Ξ	Ξ	
-81	Ŧ	=	=	=	=	=	
-A ³	i m	=	=	=	=	=	
-A ²	7	=	=	=	:	=	
-A-	Ŧ	=	=	=	a .	=	
-R -A ¹ -A ²	-c ₂ H ₅ -H	=	=	=	=	=	
Example No.	Ξ	112	113	114	115	116	

5	λ max (conting [f.l.m.) (nm.) 820	800	845	815	755	
•						
10						
15	Z Z S Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	Ξ	Ξ	Ξ	Ξ	
20	် ^ဥ					
25	$\begin{array}{c c} -K & -K \\ \hline & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ & & \\ &$	C2H5	13 C2 H5	$\left\langle \begin{array}{c} \zeta^{\text{II}_3} \\ \\ \\ \zeta^{\text{II}_3} \end{array} \right\rangle^{-1} \left\langle \begin{array}{c} \zeta^{\text{II}_5} \\ \\ \zeta^{\text{2}} \zeta^{\text{1I}_5} \end{array} \right\rangle$	$\begin{array}{c} & & \\ & \\ & \\ & \end{array} \begin{array}{c} & \\ & \\ \end{array} \begin{array}{c} & \\ & $	
30	~ ~	Can Can Nucochi	OCH ₃ C ₂ H,	OCH 3	N a	(cont'd)
35	- ii - iii	=	=	=	=	
	-11 -11 -11 -11 -11 -11 -11 -11 -11 -11	=	=	Ξ	=	
40	- 테 #	=	=	=	=	
	-A3	=	=	2	=	
45	-A ²	=	=	=	=	
50	4 H	=	=	2	=	
	-R	<u>.</u>	Ξ	=	=	
55	Example No.	118	6	120	121	

5	κτιπ γ (ccs.Ling (film)	760	770	755	775		770	
. 10		CII.3					,	
15	-2	S IN S	2 .	=	Ξ	=	=	
20		H ₃ C/						
25	¥	C ₄ H ₉ (n)	$\frac{c_{2}^{H_{5}}}{c_{2}^{H_{4}}}$	C_2^{11}	C ₂ H ₅ CH ₃ CCH ₃ C ₂ H ₄ N-CH ₃ CH ₃	$\begin{pmatrix} c_2 \mu_5 \\ 1 \end{pmatrix}$	C ₂ II ₅	
30			e GH 3	e e	G G S		S S S S S S S S S S S S S S S S S S S	(cont'd)
35	-B ³	7	=	=	=	=	:	
	-B ²	Ŧ	ŧ	.	=	Ξ	Ξ	
40	La-	7	=	Ξ	=	=	=	
	-A3	n R	=	Ξ	2	2	=	
45	-A ²	Ŧ	=	=	=	2	=	
50	-A-	Ŧ	=	=	=	=	=	
50	ä	-C ₂ H ₅	=	=	=	=	=	
55	Example No.	122	123	124	125	126	127	

5	t max (crant lng f (1 lm) (mm)	790	780	785	785	800	795	
10								
15	- 2	S S S S S S S S S S S S S S S S S S S	Ξ	Ξ	=	=	=	
20		113°C						
25	¥	C S H S C S H S	$C_{4}^{H}g^{(n)}$	C8 ^H 17(n)	$\left\langle \begin{array}{c} c_3^{11} \\ \\ \end{array} \right\rangle - N \left\langle \begin{array}{c} c_3^{11} \\ \\ \end{array} \right\rangle \left\langle \begin{array}{c} c_2^{11} \\ \end{array} \right\rangle$	^C ₂ II5	^c ₂ 115	
30			E S	G S S S S S S S S S S S S S S S S S S S	S S S S S S S S S S S S S S S S S S S	$\left\langle \begin{array}{c} C_2^{11} \\ - \end{array} \right\rangle N \left\langle \begin{array}{c} C_2^{11} \\ - \end{array} \right\rangle$ $N (COOCH)_3$	NISO ₂ CII ₃	(colle a)
35	-B3	Ŧ	=	=	=	=	=	
	182	Ŧ	=	=	=	=	=	
40	-8-	7	=	=	=	=	=	
	-A3	- B -	=	=	2	=	=	
45	-A 2	Ŧ	=	=	=	2	=	
	-A-	Ŧ	=	=	=	z	=	
50	۱ ۳	-C ₂ H ₅	=	=	=	= ·	=	
55	Example No.	128	129	130	131	132	133	

5	A max (contiluct FILm)	780	780	780	785	780	
10	-	% »	S C C C C C C C C C C C C C C C C C C C	S CLE	S C C C C C C C C C C C C C C C C C C C	S CH ₃	
15	1 23		S - S - S	S I S	S S S	S - S	
20	1		ສີ ວິ	ສິ່ວ	හි හි	ж 30.	
25 .	*	$\underbrace{\langle \ldots \rangle}_{\text{Cl}_3}^{\text{C}_2\text{H}_5}$	=	=	=	=	(P, a
30	. 68	Ŧ	=	=	Ξ	=	(cont'd)
35	-B -B -B -B	T T	=	=	=	=	
40	-A3	-B -	=	=	=	=	
		T	-	_		-	
	-4 ²	Ŧ	=	=	=	Ξ	
45	-A 1	7	=	=	=	Ξ	
50	R.	-c _{3H2} (n)	-C ₅ H ₁₁ (n)	-CII ₂		-с ₂ н ₄ осн ₃	
55	Example No.	134	135	136	137	138	~~

	λ max (ecating film) (nm)	775	780	790	790	
5	-	·N(CII ₃) ₂	.CII3	N(G ₂ II ₅) ₂		
10						
15 -	10	S S	S S	S N	S - S - S	
20		(CH ₃) ₂ N) H	(H ₅ C ₂) ₂ N		
25	¥	$\sqrt{c_2^{H_5}}$				~
30		E E	Ξ			(cont'd)
	-B3	Ŧ	=	=	=	
35	-B ²	Ŧ	=	=	Ξ	
	- m	Ŧ	=	=	=	
40	-A3	191	=	=	=	
	-A ²	Ŧ	=	=	=	
45	-A-	Ŧ	Ξ	=	=	
50	84	-си ₂ си ₂ си ₂ оси ₃ -н	-C ₃ H ₇	$-c_{2}H_{4}o\langle \overline{} \rangle$	-c ₂ H ₄ oc ₂ H ₄ ocH ₃	
	Example No.	139	140	141	142	

5	λ max (coating fllm) (nm) 790	785	785
10	S. Coll 3		
15		SS SS	
20	2 E E		
25	-K CLI 3 CLI 3	- ·	=
30	- n ₃	=	" (cont'd)
	F P F F F F F F F F	: ·	=
35	- - - -	=	=
	- Br	=	=
40	-H -H	=	=
	T-V-	=	2
45	14, 200H3	3H=CH ₂	0.
50	-R -A -A -A -H -C ₂ H ₄ (OC ₂ H ₄) ₂ OCH ₃ -H	-с ₂ н ₄ осн ₂ сн-сн ₂	-сн ₂ сн=сн ₂
55	Example No. 143	144	145

5	λ max (coat.ing film)	(um)	780	780	785	770	775	780	
10	-	N(G, 115)2							
15	_ 2	S IN S	S - S Ni	=	=	=	=	=	_
20			H ₃ c _c l ₁						
25		(H ₅ C ₂) ₂ N							
30	×	$\left\langle \begin{array}{c} C_2^{H_5} \\ \end{array} \right\rangle = \left\langle \begin{array}{c} C_2^{H_5} \\ \end{array} \right\rangle$	=	=	=	Ξ	Ξ	Ξ	(cont'd)
35	-133	Ŧ	=	=	Ξ	=	=	=	
	-B ² -B ³	Ŧ	=	=	=	=	=	=	
40	-A ³ -B ¹		=	=	=	=	=	=	
			=	=	=	=	=	7	
	1 -A 2	Ŧ	=	=	=	=	=	=	
45	-A-	Ŧ	-2	=	=	=	=	=	
50	- R	H	-c2H2OCH2CH=CH2	-с2н4он	-c ₂ H ₄ ct	$-cH_2$	-c2H4cN	=	
55	Example No.	146	147	148	149	150	151	152	

5	λ max (conting film)	820	760	785	780	770	775	740	795	
10		COII.3								
15	1.7	S Ni	=	=	=	=	=	=	=	
20		36								
25	*	C2H5	C4H9(n)	C ₅ H ₁₁ (a)	$\begin{array}{c c} & & & & & & & & & & \\ \hline & & & & & & & &$	C ₂ H ₅ / C ₂ H ₅				
30		e e	G S S S S S S S S S S S S S S S S S S S			C S S S S S S S S S S S S S S S S S S S	=	=	=	(cont'd)
	-B3	₹	: ·	=	=	=	=	=	=	J
35	-B ²	=	= .	=	=	=	=	=	=	
	-8-	=	=	=	=	=	=	=	=	
40	-A ³		Ŧ	=	CII3 CII3	- C k	-81	-0CII ₃	-Nicil ₃	
45	-A ²	Ŧ	=	=	=	=	=	=	=	
70	- 4-		=	=	. =	=	-Br	Ŧ	=	
50	ಜ	-c2H4GN -11	=		-c ₂ H ₅	=	=	=	=	
55	Example No.	25 25	154	155	156	157	158	159	160	

	λ max (coating film) (nm)	790	8 10	800	815	
5		CII.3			_	
	-	<u>}</u> =\				
10						
	1 22	S XI	Ξ	, '	=	
15		<u> </u>				
		<u> </u>				
20	İ	н 3				
		. <u>.</u>	. E E	0 N 40CH2CH=CH2		
25		£	ε / Ξ)CH2CI	(u)	
	, E	2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	C2H4C	-NIC4 ⁴ 9 (n)	
30		(<u></u>		$\langle \overline{-} \rangle$		(cont'd)
	1	<i>/</i>	H 3 C	<i>></i> /		၀၁)
35	- B3	Ŧ	=	=	=	
	-B ²	Ŧ	=	=	2	
40	-B-	Ŧ	=	=	2	
	-A ³	1 B r	=	=	=	
45	-A ²	π .	=	=	=	
50	-A-	, "	=	=	=	
30	1					
	2	-c ₂ H ₅	=	-	=	
55	Example No.	. 19	162	163	164	

λ πικ (σχιξίηη (π(1))	810 .		790		805
• -	Ni s (III)	=	=		_
2	H ₃ C	-	-	• •	ε
*	$\left\langle \begin{array}{c} \\ \\ \\ \\ \end{array} \right\rangle - \text{NHC}_{q} \text{H}_{g}(n)$	II ₅ C ₂ HN NHC ₄ Hg(n)	$\left\langle \begin{array}{c} C_4^{II} g^{(n)} \\ \\ C_{II} \\ \end{array} \right\rangle$	C2H40CH3	H ₃ C CH ₃ CH ₃ C ₂ H ₄ OCH ₃ COH ₂ COH ₃ C ₂ H ₄ OCH ₃ COH ₃ C ₂ H ₄ OCH ₃ COH ₃ COH ₃ COH ₃ COH ₃ COH ₃ COH ₄ COH ₃ COH ₃ COH ₄ CO
-B3	7	=	=	=	z
-B2	7	=	· =	=	=
-B	Ŧ	=	=	2	*
-A3	8 .	±	=	3	=
-A2	7	=	=	=	2
-A-	Ŧ	= '	=	=	=
~	-C2H5	=	=	=	=
Example No.	165	166	167	168	169

λ mnx (conting film)	CIII3 795	810	805	800	770	
	S - S - S - S - S - S - S - S - S - S -	=	=	Ξ	Ξ	
-K	С ₂ н ₅	-MIC ₂ H ₄ OH	$\left\langle \begin{array}{c} \\ \\ \\ \\ \\ \end{array} \right\rangle$ -MIC ₂ II ₄ OC ₂ H ₄ OH	$H_3 coH_6 c_3 HN $	$\underbrace{\left\{\left[\begin{array}{c} N \\ S \end{array}\right]_{N} \left[\left(\begin{array}{c} C_{2} H_{5} \\ C_{2} H_{5} \end{array}\right]\right\}}_{C_{2} H_{5}}$	(cont'd)
-B3	Ŧ	=	=	=	=	
-B2	#	=	Ξ	=	Ξ	
-81	æ	=	=	=	=	
-A ³	H0-	- NH 2	-NIC ₂ II ₅	-NHCOCH ₃	COCH ₃	
-A 1 -A 2	Ŧ	=	=	=	=	
-A-	7	z	=	= =	=	
<u>د</u> ا	-c ₂ H ₅	=	ā	=	. =	
Example No.	170	171	172.	173	1:74	

5	λ max (conting fllm) - (num)	3 780	820	770	800	
10	, - 	<u>1</u>				
15	22	S S	=	5	z	
20), H				
25	¥	$C_{2}^{\text{CH}_{3}}$ $C_{2}^{\text{CH}_{4}} \text{OCOCH}_{3}$	CH ₃ CH ₃ C ₂ H ₄ OH	2 ₂ 11 ₄ 011	-Mic ₂ II ₄ ociI ₃	
30	. E		m ₃ c	Z-22-27	NH1C ₂	(cont'd)
35	-B3	Ħ	=	=	181	
40	-B ²	Ŧ	=	=	=	
40	-4	₹	=	ង	=	
45	-A3	-Br	=	=	2	
	-A2	Ŧ	=	=	=	
50	-A1	Ħ	-Br	=	:	
	24	-C ₂ H ₅	±	=	=	
55	Example No.		176	177	178	

5	λ max (cox) that (mil) (mil) 805	790	780	790	
v	· =				
10	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	=	=	=	
	3,000				
20					
25	-K -NIIC ₂ II 40CII 3	CII3 SIN N NH	$\sqrt{\frac{c_2^{H_5}}{c_2^{H_5}}}$	C ₄ H ₉ (n)	q)
30		н3сон4с2ни	S S	CH ₃	(cont'd)
35	-Br	-C ₂ II ₅	Ŧ	Ξ	
	-B ²	=	=	=	er.
40	-B1	=	Ŧ	=	
	1	-c ₂ H ₅		z	
45	•	ပုိ	Ŧ	-scn	
	-II	. =	z	=	
50	-A1 -Br	. =	#	и 81 1	
	-R	=	=	=	
55	Example No. 179		181	182	

5	λ max (coating 'film)	790	790
10		CH13	
15	1 23	S Ni	Ξ
20		113c	•
25	Ä	C4H9(n)	=
30	2	E C	
35	1 -B ² -B ³	#	=
40	-A ³ -B ¹	-SCN -II	=
45	-A ¹ -A ²	H .	=
5a	-R -A1	-C ₃ H ₇ (n) -Br -H	-C ₄ H ₉ (n) "
	ચ 1		

EXAMPLE 185

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To a mixture of 250 g of glacial acetic acid and 50 g of acetic anhydride were added 40.2 g of a compound of formula:

 $H_5C_2 - N = C - CH_3$

and 17.5 g of a compound of formula:

OHC - HC = HC - $\frac{\text{CH}_3}{\text{CH}_3}$

and the mixture was heated at 100 to $105\,^{\circ}$ C for 4 hours while stirring. After completion of the reaction, the reaction mixture was cooled to room temperature. The reaction mixture was then poured into 1.5 liters of water containing 16.0 g of sodium perchlorate, and the mixture was stirred at room temperature for 8 hours. The thus precipitated crystals were collected by filtration and dried to obtain 53.0 g of a naphthlactam dye of the formula shown below as dark green crystals. A chloroform solution of the dye had a λ_{max} of 800 nm.

H₅C₂ - N = C - CH = CH - CH = CH
$$\frac{CH_3}{CH_3}$$

Br

CH₃

One gram of the naphtolactam dye as above obtained was dissolved in 50 g of dibromoethane, followed by filtration through a filter of 0.22 μm . The resulting solution (2 ml) was coated on a susbtrate of grooved PMMA disc in the same manner as in Example 2 to form a coating film having a thickness of 700 Å. The coated film had a λ_{max} of 820 nm with a broad peak width.

When a semiconductor laser beam having a center wavelength of 830 nm and a beam diameter of 1 μ m was irradiated on the coated film at an output of 6 mW, clearly outlined pits having a width of about 1 μ m and a pit length of about 2 μ m were formed. The C/N ratio of the pits was 52 dB. The coated film exhibited satisfactory light resistance and resistance to reproducing light.

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EXAMPLE 186

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In the same manner as described in Example 185, a naphtholactam dye of the formula shown below was synthesized. A chloroform of the dye had a λ_{max} of 795 nm.

$$^{\text{H}_3\text{COH}_4\text{C}_2}$$
 $^{\text{H}}$ = C - CH = CH - CH = CH $^{\text{C}_2\text{H}_5}$ $^{\text{C}_2\text{H}_4\text{OCH}_3}$ $^{\text{C}_2\text{H}_4\text{OCH}_3}$

One gram of the naphtolactam dye as above prepared and 1.5 g of nitrocellulose ("RS-20" produced by Daicel Chemical Industries, Ltd.) were dissolved in 50 g of ethyl cellosolve, and the solution was filtered through a filter of 0.22 μ m. 3 ml of the resulting solution was dropped on a substrate of polycarbonate resin disc having a diameter of 120 mm which had been grooved to a depth of 650 Å and a width of 0.7 μ m and coated by a spinner at 1,500 rpm, followed by drying at 60°C for 10 minutes. The coated film has a thickness of 700 Å as measured in the same manner as in Example 1. The coated film exhibited maximum absorption at 810 nm of wavelength with a broad peak width.

When a semiconductor laser beam having a center wavelength of 830 nm and a beam diameter of 1 μ m was irradiated on the coated film at an output of 6 mW, clearly outlined pits having a width of about 1 μ m and a pit length of about 2 μ m were formed. The thus formed recording layer had a C/N ratio of 51 dB and exhibited satisfactory light resistance and resistance to reproducing light.

EXAMPLE 187

A naphtholactam dye of the formula shown below was synthesized in the same manner as in Example 3. A chloroform solution of the dye had a λ_{max} of 800 nm.

$$H_5C_2 - N = C - CH = CH - CH = CH - CH_3$$
 CH_3
 CH_3

One gram of the naphtholactam dye as above prepared was dissolved in 50 g of dibromoethane, followed by filtration through a filter of 0.22 μ m. 2 ml of the resulting solution was dropped on a substrate of PMMA disc having a diameter of 120 mm which had been grooved to a depth of 700 Å and a width of 0.7 μ m and coated by a spinner at 650 rpm, followed by drying at 60 °C for 10 minutes. The film thickness was 800 Å as measured in the same manner as in Example 1. The coated film had a λ_{max} of 820 nm with a broad peak width.

When a semiconductor laser beam having a center wavelength of 830 nm and a beam diameter of 1 μ m was irradiated on the coated film at an output of 6 mW, clearly outlined pits having a width of about 1 μ m and a pit length of about 2 μ m were formed. The recording layer thus formed had a C/N ratio of 51 dB and exhibited satisfactory light resistance and resistance to reproducing light.

EXAMPLES 188 TO 278

In the same manner as in Example 185, naphtholactam dyes shown in Table 3 were synthesized. The wavelength of the absorption maximum of each of the resulting dyes in its chloroform solution was as shown in Table 3.

Each of the dyes was coated on a substrate of grooved PMMA disc in the same manner as in Example 185 to form a recording layer. When a semiconductor laser beam having a center wavelength of 830 nm was irradiated on the recording layer, clearly outlined pits were formed. The recording layer had a high reflectance, high sensitivity, and an excellent C/N ratio and exhibited satisfactory light resistance and resistance to reproduced light.

5								
10		λ max (in CICL ₃) (nm)		810	807	807	800	
15		'2	_ ⁷ 080	:	=	=	<u>.</u>	
20			10 10	(u) (u)	(u)	(u)	(п) ОСН ₃	
25	I=CH−K 2 - 2	*	$\begin{array}{c c} & & & & & & & & \\ & & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ \end{array}$	C4H9(n)	$\begin{pmatrix} -1 \\ -1 \end{pmatrix}$	$\frac{1}{2} - N \begin{pmatrix} c_2 H_5 \\ c_4 H_9 (n) \end{pmatrix}$	$\begin{array}{c} \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \end{array} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \end{array} \\ \\ \end{array} \\ \\ \\ \end{array} \\ \\ \\ \end{array} \\ \\ \\ \\ $	
30	G-CH-CH-CH-CH-K	-B3	·#	=	=	=	<u>.</u>	(cont'd)
	F	1B2	Ξ.	=	=	2	=) (G
35	A 2 / A	1 B	Ŧ	=	=	=	=	
		-A3	HB.	en en	=	=	=	
40	φ} ·	-A2	Ŧ	=	=	=	=	
45	stam Dy	-A.	Ŧ	=	=	2	=	
	Naphtholactam Dye	a.	-c ₂ n ₅	=	Ξ	=	=	
50	žI	Example No.	188	189	190	191	192	

5	$\lim_{\lambda \to 0} \frac{\lambda}{(\ln C(0)_3)}$	ì c	6	G .				
**	\H.	800	790	800	800	785	800	
10	_2	C204	=	Ξ	2	=	=	
15							GH ₃	
20	*	$\left\langle \begin{array}{c} \\ \\ - \end{array} \right\rangle_{N} \left\langle \begin{array}{c} c_{4}H_{9}(n) \\ \\ c_{2}H_{4}occH_{3} \\ \\ 0 \end{array} \right\rangle$	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} c_{4} + g(n) \\ \\ \end{array} \right\rangle_{C_{2} H_{4} C \ell}$	$\left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle_{C_{2}H_{4} \text{ occoch}_{3}} $	$\begin{pmatrix} \begin{pmatrix} \\ \\ - \end{pmatrix} \end{pmatrix} - N \begin{pmatrix} C_4H_9(n) \\ \\ - \end{pmatrix} \begin{pmatrix} C_2H_4COC_2H_5 \\ \\ 0 \end{pmatrix}$	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{C_{2}H_{4}CN}$	$\begin{pmatrix} & & & & & & & & & & & & & & & & & & &$	
25								
30	1 B3	Ŧ	=	=	=	=	= '	(cont'd)
	-B ²	Ŧ	=	=	=	Ξ	=	3)
35	-81	Ŧ	Ξ	=	=	=	=	
40	-A3	-Br	=	=	=	=	=	
	-A ²	Ŧ	=	=	=	Ξ	=	
45	-4-	Ŧ	=	=	=	=	=	
50	4	-C ₂ H ₅	=	=	=	=	=	
	Example No.	193	194	195	196	197	861	

5	등								
10	(in CHCH.	800	810	790	800	800	800	800	
,,	72	cro4	Ξ	=	Ξ	=	=	=	
15						≻NO ₂		a 2	
20	¥	$\left\langle c_{4^{H_9}(n)} \right\rangle$	$\left\langle -N \left\langle C_4 H_9(n) \right\rangle \right\rangle$	$\left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle^{-N} \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle^{-1} \left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle$	$\sim c_4^{H_9(n)}$	$\begin{array}{c} C_4^{H_9(n)} \\ C_2^{H_4} \\ \end{array}$	$C_4H_9^{(n)}$ CH_2	$\left\langle c_{4}^{H_9(n)} \right\rangle$	
25			N N		N I		N N		
30	e .	#	=	=	=	=	= ·	<u>.</u>	(cont'd)
	-B2	Ŧ	=	=	=	=	=	. =	9)
35	-m	Ŧ	=	=	=	=	=	=	•
	-A3	-Br	=	=	=	d =	=	=	
40	-A2	Ŧ	=	=	=	=	=	=	
45	-A-1	Ŧ	2	=	=	2	=	=	
50	4	-C ₂ H ₅	Ξ	=	= .	=	- ±	=	
55	Example No.	199	200	201	202	203	204	205	

5								
10	े एक्ट नि (न ह्यांच्ये के	820	820	825	870	840	780	
15	- z	_ 'CRO' _	ī	= .	-	÷	=	
20	, K	$\sim c_2^{c_2^{H_5}}$	C2H5	$\begin{array}{c} C_4^{H_9(n)} \\ C_4^{H_9(n)} \end{array}$,c ₂ H ₅ ,c ₂ H ₅	C2H5	√ _N C ₆ H ₁₃ (n) C ₆ H ₁₃ (n)	
25		CHI3	CHI ₃	e and the second	MICOCH ₃	CH3 C2 OGII3	C_{1}	
30	-B3	7	=	=	=	. =	Ξ	(cont'd)
	-B2	Ŧ	=	=		=	=	၁)
35	-B-	F	=	=	=	=	:	
	-A ³	-Br	=	=	=	=	=	
40	-A ²	7	=	=	=	. =	=	
45	-4-	Ŧ	=	=	=	=	=	
•	25	-c ₂ H ₅	=	=	=	=	=	
50	Example No.	206	207	208	209	210	211	

$\frac{z^{-}}{(\ln \operatorname{CliC})_{3}}$	C2O4 810	800	008 _1	795	Br 810	810	
		$\left\langle \frac{c_{2}^{1}}{2}\right\rangle - N \left\langle \frac{c_{2}^{1}H_{5}}{c_{2}^{1}H_{4}} N \left\langle \frac{c_{2}^{1}H_{5}}{c_{2}^{2}H_{5}} \right\rangle$	$\left\langle \begin{array}{c} c_2^{H_5} \\ - \end{array} \right\rangle = \left\langle \begin{array}{c} c_2^{H_5} \\ - \end{array} \right\rangle \left\langle \begin{array}{c} c_2^{H_5} \\ - \end{array} \right\rangle$	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle^{-N} \left\langle \begin{array}{c} c_2^{H_5} \\ \\ \end{array} \right\rangle^{CH_3} \\ I^{\Theta} \left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle^{CH_3}$		$\left\langle \begin{array}{c} C_2^{H_5} \\ - \end{array} \right\rangle = \left\langle \begin{array}{c} C_2^{H_5} \\ - \end{array} \right\rangle$	
1 B3	7	=	=	=	= -	=	(cont'd)
-B ²	Ŧ	=	=	=	. =	Ξ	9)
-8-	Ħ	=	=	= ·	Ξ	=	
-A3	ä	=	=	Ξ	=	=	
-4 ²	Ŧ	=	=	=	=	=	
-A-	Ŧ	=	=	=	=	=	
<u>د</u> ا	-c ₂ H ₅	=	=	=	=	=	
Example No.	212	213	214	215	216	217	

5	i ₃)						•	
10	$\frac{z^{-}}{(nu)} \frac{(nu)}{(nu)}$	Br 830	11 820	815	806	11 840	BF ₄ - 835	,
15							Ā	
20	¥	$\overline{\bigcirc}$	$\begin{pmatrix} c_2^H_5 \\ -c_4^H_9(n) \end{pmatrix}$	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{S_{H_{17}(n)}}$	c ₃ H ₇ (1)	C ₂ H ₅	c ₂ H ₅	
25					VN ($\left\langle \begin{array}{c} C_2^{H_5} \\ \\ \end{array} \right\rangle_{\text{NIICOOCH}_3} C_2^{H_5}$	NHSO ₂ CH ₃	
30	-B3	Ŧ	=	=	.	=	= .	(cont'd)
	-B2	Ŧ	=	=	=	=	=	ق
35	-B_	Ŧ	=	=	=	=	=	
	-A ³	-Br	Ξ	=	= .	=	=	
40	-A ²	Ŧ	=	=	=	=	=	
45	-A-	Ŧ	Ξ	=	=	=	=	
	<u>ا</u>	-c ₂ H ₅	=	=	Ξ .	=		
50	Example No.	218	219	220	221	222	223	_
55	•							-

5	nči3));											
	(in CK13)	805	805	805	805	805	808	805	805	805	805	
10	- 2	ыт ₄ -	=	=	=	=	2	os	<u> </u>	<u>-</u>	=	
		•	_	-	-	-	-		-	-	-	
15		C2H5										
20	¥	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle^{-N} \left\langle \begin{array}{c} c_2 \\ \\ \end{array} \right\rangle^{5}$	=	=	2	=	Ξ	=	=	£	=	
	-B3	∓	=	=	=	=	=	=	=	=	=	
25	-B ²	=	= [~]	=	2	=	=	_		_		
		T .	-	-	-	-	-	=	=	=	=	Ė d)
30	P	Ŧ	=	=	=	=	=	=	=	· =	=	(cont'd)
	-A3	ង	z	=	=	=	=	=	=	=	=	
35	-A2	Ŧ	=	=	=	=	=	= ,	=	=	=	
-	-	₹	=	=	=	=	=	=	=	=	=	
40	1										es	
4 5	e4		^			e	H ₂ 0CH ₃			1 ₄ 0CH ₃	-с ₂ н ₄ ос ₂ н ₄ ос ₁ н ₄ осн ₃	
50		-C ₃ H ₇ (n)	-C ₅ H ₁₁ (n)	-cH ₂		$-c_2H_4$ OCH $_3$	-ch ₂ ch ₂ ch ₂ och ₃	-c ₃ H ₇	$-c_2H_4O\left\langle \begin{array}{c} \end{array} \right\rangle$	-c ₂ H ₄ oc ₂ H ₄ o	-c ₂ H ₄ oc ₂ 1	
55	Example No.	224	225	226	227	228	229	230	231	232	233	

5	λ. IIFIX (in CiKl ₃) (nm)							805	810	800	
10	_2	-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\-\	=	=	C204"	÷	SCN	1	Ξ	z	
15	:	2 ^H 5 2 ^H 5		-							
20	¥	C ₂ H ₅	=	:	=	Ξ	= ·	=	=	=	
25	-B3	Ŧ	=	=	=	=	=	=	=	=	
	-B ²	Ŧ	=	=	=	=	=	=	=	=	d)
30	-8-	Ŧ	= '	=	=	=	=	=	=	£	(cont'd)
·	-A3	-Br	=	=	=	=	=	=	=	Ħ	_
35	-A ²	Ŧ	=	=	=	=	=	=	=	=	
40	-A-	Ŧ	=	Ξ	=	=	Ξ	=	=	z	
4 5	-R	$-c_2H_4$ och $_2$ ch $=$ GH $_2$	-ch ₂ cH≈ch ₂		$-c_2 H_4 o c H_2 c H = c H_2$	-с ₂ н ₄ он	-c ₂ H4c&	H C	-c ₂ H ₄ CN		
50	1	-C ₂]	HO-	=	-c ₂ 1	-c ₂ t	-c ₂ 1	-cH ₂ /	-c ₂ 1	Ξ	
55	Example No.	234	235	236	237	238	239	240	241	242	

5	(in CHCL ₃)	820	810	810	800	820	805	810	
10	12	SCN	_ [_] _	=	3 \\So_3_	=	~	- so ₃ -	
15 20	¥	\sim	$C_4H_9^{(n)}$	$(1) \begin{pmatrix} c_5 & c_1 & c_1 \\ -c_5 & c_1 & c_1 \end{pmatrix}$. сн. з сн. з	, c ₂ H ₅ , c ₂ H ₅	Ť		
25				N ()	CH CH 3	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} c_{2}^{H_{5}} \\ \\ \end{array} \right\rangle_{C_{2}^{H_{5}}}$	Ξ	. =	
3ō	-B ² -B ³	ቸ ሞ	==	: :	=	=	=	=	(cont'd)
35	-B	Ŧ .	.=	=	=	=	=	z	
40	-A ³	-N G	Ŧ	=	=	-N CII 3	ಷ ೮ -	1Br	
	-A ²	₹	=	=	=	=	=	=	
45	-A-	•	Ξ	=	=	=	=	i g	
50	æ	-c ₂ H ₄ cN	Ξ	=	Ŧ	-C ₂ H ₅	=	=	
55	Example No.	243	244	245	246	247	248	249	

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5	λ mnx (in ClCl3) (nm)	rso ₃ 815	820	840	860	840
10	_ 2		Ξ	_ ຽາບ	=	
75			-		en en	±CII 2
20	*	C2H5	 Е—	CH ₃ CH ₃ CH ₃ CH ₃ CH ₃ CH ₃	C ₂ H ₅	C21140CH2CH2CH2
25	110		: 0		, E	
30	-B3	Ŧ	=	=	=	" (cont'd)
35	1 -B ²	Ŧ	:	=	= .	=
	-B	F	2	=	=	=
40	-A ³	-0GH ₃	-NHCII 3	н ж Г	=	=
45	-4 ²	Ħ.	=	=	=	=
50	-A-	Ŧ	=	= .	:	=
	-R -A1	-c ₂ H ₅ -H	=	=	=	=
55	Example No.	250	251	252	253	254

5	λ max (in CiC) ₃)	860	860	850	800	835	
10	_2	- ⁷ 070	=	=	= '	z	
15		·		(u)			
20	¥	√инс ₄ н ₉ (n) !	Υміс ₄ н ₉ (п) ⟩	$V_{N}^{CH_3}$ CN $V_{N}^{CH_2}$ (n)	\rightarrow $N \subset C_4 H_9(n)$ $C_{H_2} C_{H_2}$	CH ₃ CH ₃ CH ₃ C ₂ H ₄ OCH ₃	-
25				H ₅ C ₂ HN			
30	-B3	Ħ	=	=	=	= .	(cont'd)
35	-B ²	Ħ	=	=	=	=	Ĭ
	-18-1	#	= .	=	=	=	
40	-A3	- Br	=	=	Ξ	Ξ	
45	-A ²		=	=	=	=	
50	-R -A-1	7	=	=	=	=	
	r.	-C _{2.5}	=	=	=	=	
55	Example No.	255	256	257	258	259	-

5	اج (جانباء) (ناتباء) (سم)	855	8:15	860	865	835	
10	Z (i)	3 _ '070	=	-	æ =	co	
15		ຼຸຄ _ ຄ_ຄ			Ю	∽cn >niic ₃ il ₆ ocii ₃	
20	¥	C2H400CH3	C2H2	-инс ₂ н ₄ он	-NHC2H40C2H40H	#5 - S	
25	ile)	3.c ×	$\langle \rangle$			H ₃ coll ₆ c ₃ HN	
30	i i	#	= ,	=	=	=	(cont'd)
	1B2	#	=	=	=	=	(د
35	-8-	Ŧ	=	=	=	=	
40	-A ³	ы ee I	10-	- Nii 2	-NIC ₂ H ₅	-Nilcocii ₃	
45	-A ²	Ŧ	=	2	z	=	
	4	Ŧ	=	=	=	=	
50	-R -A -A ²	-c ₂ H ₅	:	±	=	=	
55	Example No.	260	261	262	263	264	

5	$\frac{\lambda \text{ inix}}{(nin)}$	820	830	098	830
10	72	C204_	Ξ	z	=
15			e e	, ev ev	
20	¥ 	\sim	C2H40COCH3	C2H4OH	C ₂ H ₄ OH
25		=<)		\ <u>``</u>
30	-B3	,#ï	=	: .	=
	-B ²	Ħ	Ξ	=	=
35	- 4-	Ŧ.	Ξ	=	-Br
40	-A 3	COCH ₃	- B	=	=
4 5	-A 2	Ŧ	=	Ξ	=
	-A-	Ŧ		11 21	=
50	24	-c ₂ H ₅		=	=
55	Example No.	265	266		

5	λ inex (in CfC13) (nm) 855	855	835	820	828	
10	C 2 C 4 C 4 C 4 C 4 C 4 C 4 C 4 C 4 C 4	z	=	=	SCN	
15			CON)		
20	-K -NHC ₂ II ₄ OCH ₃	-NHC ₂ H ₄	CH ₃ CH ₃ COH ₄ C ₂ HN NH→NH→	$\begin{array}{c c} & & & & & & & & & & & & & & & & & & &$	C4H9(n)	
25			нзсон		E S	•
30	- Br	.	-c ₂ H ₅	Ŧ	= .	(cont'd)
	-B2	=	=	=	=	ō)
35	-Br	=	=	Ŧ	=	
40	-A ³	-0- 13	-c ₂ 11 ₅	Ŧ	-scn	
	-A ²	=	= ,	Ξ	=	
4 5	-A-1	=	=	Ŧ	=	
50	-R -C ₂ H ₅	Ξ	=	=	2	
55	Example No. 269	270	271	272	273	

5	المال المال المال (أو CHCl ع) (mu) (mu) 828	825	825	825	820
70		Ξ	PF -	Sir6	Tir6
15	-K C4H9(n) CH3	=	=	=	=
20	₽ E	•	•		
	-II PB 3	=	=	=	=
25	-B 2	=	=	=	=
30	-A ³ -B ¹	=	=	=	=
	-A ³	ង	=	=	= -
35	-4 -11 -14 -2	=	=	=	z
40	- N	=	Ξ	=	=
45	Example -R -R 274 -C ₃ H ₇ (n)	=	-c ₂ H ₅	=	=
50	Example No.	275	276	277	278

EXAMPLES 279 TO 365

In the same manner as described in Example 187, naphtholactam dyes shown in Table 4 were synthesized. Each of the resulting naphtholactam dyes was coated on a substrate of grooved PMMA disc in the same manner as in Example 187 to form a coated film. The wavelength of the maximum absorption of the coated film was shown in Table 4.

0 224 261

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When a laser beam having a center wavelength of 830 nm was irradiated on the coated film, clear-outlined pits were formed. The coated film had a high reflectance, high sensitivity, and an excellent C/N ratio and exhibited satisfactory light resistance and resistance to reproducing light.

10			λ nax (coating) film)	(IIII) 825	830.	827	827	. 818	
15	٠.			S (III)					
20			_ 7		:	:	: .	=	
25		. H 2		OE H					
30	41	$R-N = C-CH=CH-CH-CH-K$ $A_3 B_3$	· ¥	$\left\langle \left\langle \left$	$\sum_{n} \sum_{c_4 \mu_9(n)} c_4 \mu_9(n)$	$\left(\begin{array}{c} \\ \\ \end{array}\right)_{-N} \left(\begin{array}{c} \\ \\ \end{array}\right)_{3,1,1,(n)}$	$\begin{pmatrix} \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{pmatrix}$ $\begin{pmatrix} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	$\left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle^{-N} \left\langle \begin{array}{c} c_4 \Pi_9(n) \\ \\ c_2 \Pi_4 \text{ och } 3 \end{array} \right.$	(P, 3
35	Table	A 3 B 3	-B3	[=	<u>=</u>	=	<u>-</u>	(cont'd)
40		A . A A	1 -B2	Ŧ	=	=	=	=	
		ωį	. 6.1	∓	=	=	=	=	
_		ат Ду	-A2 -A3	- Br	=		=		
45		olact		∓	=	=	=	=	
50		Naphtholactam Dye	e4	-C2H5 -	=	=	=	- -	,
		·	Example No.	279	280	281	282	283	

10	λ nerx (œating film) - (mm)	815	. 018	8 5	. \$18	800	
15	'. 'a			, s		30 70 N	
20		=	=	Ca Strain	S N S N S N S N S N S N S N S N S N S N	Ct Ct	
25					•		
30	¥ .	C2114 OCC113	$\begin{array}{c} C_{4}^{\mu} (n) \\ C_{2}^{\mu} (c) \end{array}$	$\begin{array}{c} & & & & & & & & & & & & & & & & & & &$	$= \sum_{\substack{\alpha \in \mathcal{A}^{H_9(n)} \\ \beta \in \mathcal{A}^{H_4(GG_2H_5)}}} c_2^{H_4(GG_2H_5)}$	C ₂ H ₄ CN	(cont'd)
35	-13	¥ .	<u> </u>	7	⋄	\\	
40	-A ³ -B ¹ -B ²	=	= =	∓	=	- - -	
45	-A1 -A2	=	=	- PE	2	=	
	1	2	=	=	=	Ξ	
50	<u>د</u> ا	= .	=	-c ₂ H ₅	=	=	
	Example No.	284	285	286	287	288	

. 5	\ max (coating film)	815	#15	825	805	815	
10	:		CIII3	Y N(C;2115)2		, t _{mb}	
15 ·	_2	S s s	S	S S.	2 5 1 Z	S I Z	
20		H ₃ C	H ₃ C	(C ₂ H ₅) ₂ N (S ₁ S ₂ S ₂)		H ₃ C	
25		n) С ₂ H ₄ OCH ₃			G (1)		
30	. 4	$\begin{pmatrix} & & & & & & & & & & & \\ & & & & & & & $	$\left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle^{N} \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle^{(n)} \left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle$	$\left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{smallmatrix} c_{d}^{H} g^{(n)} \\ \\ \\ \end{smallmatrix} \right\rangle_{C_{2}^{H} q} \left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle$		$\sum_{c_2 \mu_4^{OH}} c_{c_3 \mu_4^{OH}}$	(cont'd)
35	- B 2 - B 3	÷	:	-	=	\$\frac{1}{2}	
40	-A ³ -B ¹ -1	= =	± =	-Br -!!	=	= -	
4 5	-4 ²	=	=	; ;	=	=	
	-¥-	=	=	₹ .	=	=	
50	64	3	=	-C2H5	=	=	
	Example No.	289	290	291	292	293	

5	A max (coating - film) - film)	815	820	835	835	840	
10	3.7.	· · · · · · · · · · · · · · · · · · ·	6	œ	*	æ	
15	2 - S - S - Ni	\ \ \ \	#	=	=	Ξ	
20	H ₃ C						
25	(a)	$C_2H_4O\left\langle \begin{array}{c} - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - \\ - $	(n)			ં લ	
30	K	C2H40	$\left\langle \begin{array}{c} c_4 \mu_9(n) \\ \\ \end{array} \right\rangle \sim \left\langle c_2 \mu_4 o \right\langle \left\langle \begin{array}{c} \\ \end{array} \right\rangle$	$\left\langle \begin{array}{c} c_2 \mu_5 \\ \end{array} \right\rangle \left\langle \begin{array}{c} c_2 \mu_5 \\ \end{array} \right\rangle$	C2H ₃	$\begin{array}{c} \begin{pmatrix} & & & & & & & & & & & \\ & & & & & & &$	(cont'd)
35	= =	=	=	=	=	=	
	- I - I - I - I - I - I - I - I - I - I	=	=	=	•	=	
40	-A ³ -B ¹	=	2	=	=	=	
	81	=	=	=	=	#	
45			=	=	=	=	
	-R -A1	4 =	=	=	=	=	
50	Example No.		296	297	298	299	

5		-						
	A DEIX (CAALTING) ' Film)	870	850	800	8.10	820	. 820	
10								
75	_ 7	S S S.	=	=	Ξ	=	, =	
20		п ₃ с						
25				,		1,11,5 1,11,5 1,11,5		
30	¥	OCH 3 C2H 5 MICOOH 3 C2H 5	GCH ₃ GCH ₃ GCH ₅	$\underbrace{\left\langle \begin{array}{c} c_{H_{13}(n)} \\ c_{L_{13}(n)} \end{array} \right\rangle}_{C_{L_{13}(n)}} c_{L_{13}(n)}$	$\left\langle \begin{array}{c} C_{4}H_{9}(n) \\ \\ \end{array} \right\rangle \left\langle \begin{array}{c} C_{4}H_{9}(n) \\ \end{array} \right\rangle$	$\left\langle \frac{c_{2}^{H_{5}}}{c_{2}^{H_{4}}} \right\rangle \left\langle \frac{c_{2}^{H_{5}}}{c_{2}^{H_{5}}} \right\rangle$	$\left\langle \begin{array}{c} \\ \\ - \end{array} \right\rangle_{N} \left\langle \begin{array}{c} c_2 \mu_5 \\ \\ c_2 \mu_4 \mu \mu_2 \end{array} \right.$	(cont'd)
35	123	7	=	:	=	, =	• =	
	-13-2	₹	=	=	=	=	=	
40	- e	Ŧ	=	=	=	±	=	
	- Y	त त	=	=	=	=	=	
	-42	Ŧ	=	=	=	2	=	
45	-A-	Ŧ	=	=	=	=	=	
	4	-c ₂ ll ₅	=	=	=	=	=	
50	Example No.	300	301	302	303	304	305	

·					
10	(((A) (1) (((A) (1) (((A) (1) ((((A) (1) ((((((((((8.30	830	845	815
15	Z	=	=		2
20] ₃ c				
25	-k -C ₂ ₅ CH ₃ -C ₂ H ₄ N-CH ₃ -C ₃ H ₄ N-CH ₃	±2 ⟨¬⟩	PHS OGII3		C ₄ H ₉ (n)
30				C. L. S. II.S	H 3 (F)
35	F F	=	=	=	=
		2	=	=	=
40	77 -	=	=	:	=
	-A3	=	=	=	=
	- F	=	=	=	=
4 5	T	=	=	=	: .
50	-C ₂ H ₅	=	z	=	±
	Exampl e No	307	308	309	310

5						
	A max (centring Lilin)	\$1.8	826	87.5	845	
10					(-)	
15	_z	S S.	z	=	S Ni	
20		H.3.c	-			
25		, (n) , (n)	9			
. 30	-K	$\left\langle \begin{array}{c} \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{smallmatrix} c_{B^{H}17}(n) \\ \\ c_{B^{H}17}(n) \end{smallmatrix} \right\rangle$	$\left\langle \begin{array}{c} C_3 H_7(1) \\ \end{array} \right\rangle \left\langle \begin{array}{c} C_2 H_3 \end{array} \right\rangle$	MICOOCH ₃ C ₂ H ₅	NHSO ₂ CH ₃	(cont'd)
35	-13 -13	7	=	=	÷	
40	-A -B -1	-8r -11 -1	= =	=	=	
45	1 -A ²	Ŧ	2	=	=	
4 5	-R -A ¹	-C2H5 -H	=	=	=	
50			=	=	= .	
	Example No.	311	312	313	314	

5	(exacing film)	825	825	\$2H	H25	825	825	820	820	н20	
10		× × ×			-						
15	2	S - S - S - S - S - S - S - S - S - S -	2-	=	Ξ	=	z	S S.	=	±	
20		iO iO			•						
25	X-	C2NS	=		Ē	=	=	=	=	=	~
30	-B3	7	=	=	=	=	=	=	=	=	(cont'd)
•	1 -B2	Ŧ	=	=	=	=	=	=	=	. .	_
35	-A3 -B1	-Br -li	=	=	=	=	=	=	=	=	
	-A 2	Ŧ	z	=	=	=	=	=	=	=	
40	4	7	=	=	=	=	= ,	=	=	=	-
45	e4	-C ₃ H ₇ (n)	-C ₅ H ₁₁ (n)	-GH ₂		-c ₂ H ₄ ocH ₃	-ch ₂ ch ₂ ch ₂ och ₃	-c ₃ H ₇	$-c_2^{H_4}$ o $\left\langle \begin{array}{c} \cdot \\ - \end{array} \right\rangle$	$-c_2H_4oc_2H_4ocH_3$	
	Example No.	315	316	317	318	319	320	321	322	323	

5	λ max (exxiting Ellin)	e s		•								
	A COS	(nm) 825	825	820	825	825	825	G. 8	825	830	820	
10	-											
15	_2_	SS.	ŧ	=	=	H36 (1) S/- (8) S/- (8	=	=	Ξ	Ξ	Ξ	
25	Ä	$\left\langle \begin{array}{c} c_{2^{\mathrm{H}_{5}}} \\ - \end{array} \right\rangle^{-N} \left\langle \begin{array}{c} c_{2^{\mathrm{H}_{5}}} \\ - \end{array} \right\rangle$	=		=	=	z	=	=	:	=	
30	. H.	Ŧ	=	=	=	. =	± ·	=	z '	=	=	(cont'd)
•	-13-	7	=	=	=	=	=	. =	=	=	=	ğ
•	-8	Ŧ	2	=	2	=	=	=	=	=	=	
35	-A3	-Br	=	=	=	3	=	=	=	=	7	
	-A2	Ŧ	=	=	=	= -	=	=	=	=		
40	4	7	=	=	=	=	=	=	=	=	=	
4 5 50	&	-C ₂ H ₄ OC ₂ H ₄ OCH ₃	-c ₂ H ₄ OCH ₂ CH=CH ₂	-cH ₂ CH≖CH ₂	#	-C ₂ H ₄ OCH ₂ CH=CH ₂	-С ₂ н ₄ он	-c ₂ 114 cr	$-cH_2$ $\begin{pmatrix} H \\ D \end{pmatrix}$	-c ₂ H ₄ cN	=	
	Example No.	324	325	326	327	328	329	330	331	332	333	

5	(axatting)	835	830	830	835	815	825	835	835	
10										
15	'2 ×	S S S S S S S S S S S S S S S S S S S	=	=	= .	ā	=	Ξ	=	
20 .	=	m								
25	-K	$\frac{7}{100}$ $\frac{2}{100}$ $\frac{2}{100}$	C ₄ H ₉ (n)	$\left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle_{N} \left\langle \begin{array}{c} \\ \\ \\ \end{array} \right\rangle_{I_{1}(n)}$	C ₂ H ₅	=	=	=	=	(P,
30										(cont'd)
	-B3	7	=	=	=	=	=	=	=	
35	-B ²	Ŧ	=	=	- =	=	=	=	=	
	-	Ŧ	=	=	=	=	=	=	=	
40		CII)	7	=	-N CH ₃	ສຸ	-Br	-0CII ₃	-Nich ₃	
		7	=	=	=	=	=	=	=	
45		Ŧ	=	=	=	=	a F	Ŧ	=	
		-c ₂ H ₄ CN	=	=	-c ₂ H ₅	=	=	=	=	
50	Example No.	334	335	336	337	338	339	340	341	

5	<u>E</u> 3.				•
	λ max .(œating film) (mm) 22	875	855	H75	
10					
15	Z NIN S	=	Ξ	Ξ	
20	 =	· E E	t=cH ₂		
25	C2H5 CH3	C2 ^{II} 5	$\begin{pmatrix} 0 \\ N \\ c_{2} II_{4} OCH_{2} CH_{2} CH_{2} \end{pmatrix}$	√инс ₄ и ₉ (п)	Ω.
30	· 〈	30 = 30	=		(P, luoo)
35	-B -	=	=	= ·	
40	-A ² -A ³	.	=	=	
4 5	- = = = = = = = = = = = = = = = = = =	=	<u>.</u> =	=	
50	-C ₂ H ₅	=	=	=	
	Example No.	343	344	345	

5	λ πακ (αλιξικη (fl lm) (nm) 875	865	820	855	870
10	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			CHI.3	,
15	S - S - S - S - S - S - S - S - S - S -	=	Ξ	S S S	=
20	5) 2 (-)	
25	-K VNIIC ₄ II ₉ (n)	CH ₃	$\left(\begin{array}{c} C_4 \Pi_9(n) \\ \\ \end{array}\right)^{N} C_4 \Pi_9(n)$	CH ₃ CH ₄ OCH ₃ CA ₂ H ₄ OCH ₃	CH ₃ C ₂ H ₄ OCH ₃ C ₂ H ₄ OCH ₃
30		"SC2HN		$\langle \overline{\Box} \rangle$	II ₃ C
	- FB3	=	=	=	=
35	-11 -11	=	.=	=	=
	1=1	=	=	7	=
40	-43 -Br	±	z	=	=
	-F -	=	=	=	=
45	7 7	=	= .	=	=
	-R -C ₂ H ₅	=	=	z	E .
50	Example No.	347	348	349	350

5	λ max (cxatting film) - (inm) - (inm) - (inm) - (inm)	875	875	
10	(a) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	60	₽	
15	z s in s	e	=	
20				
25	A C C 2 2 2 S S	NHC ₂ H ₄ OII	MIIC ₂ H4OC ₂ H4OH	
30			*	(cont'd)
35	-B -B -B -B -B -B -B -B	=	=	
40	-A3	- Ni 2	-NIC ₂ II ₅	
45	н -н	: :	=	
50	351 -C ₂ H ₅ -H	2	=	
	Example No.	352	353	

5							
	λ πυχ (συατίης ·film)	3 BSS	825	81.8	H75	845	
10		CIII 3					
15	. '2	S IN S	=	=	=	=	
20		= 3° = .					
25	¥	CH3 CN CN 3IIN N NIIC3H6OCH3	C2H5	$c_{2^{11}4}^{\text{CH}_3}$ $c_{2^{11}4}^{\text{COCH}_3}$	C ₂ H ₂ OH	$c_{2^{11}4^{013}}$	(cont.d)
30		H ₃ coll ₆ c ₃ 11N		$\langle \overline{-} \rangle$, , , , , , , , , , , , , , , , , , ,		2
35	-13 1 -13 -13] - 11	± ±	= .	5 =	=	
40	-A ³ -13 ¹	-NI GOGH 3 -11	COCH ₃ "	= # # !	=	- Br	
45	-A ¹ -A ²	₹	`Z` : :	=	= 148 +	. =	
50	4	-C2H5 -H	3	=	=	=	
ou.	Example No.	354	355	356	357	358	

5	A max (exacting Fitm)	860	860	840	830	
10	(8)) COII, 1	₹.	20	œ	
15 .	_ 2	H ₃ C (S/-, S/-, S/-, S/-, S/-, S/-, S/-, S/-,	<u>.</u> .	=	=	
25	¥	∽niic ₂ H ₄ ocii ₃	-NIIC ₂ II 40CH 3	NS N	² 2 ¹¹ 5 2 ¹¹ 5	
30		NIIC ₂	MIIC ₂	-с ₂ и ₅ и ₃ сон ₄ с ₂ ии	$\left(\left(\frac{1}{s}\right)\right)_{N}\left(\left(\frac{c_{2}H}{c_{2}H}\right)\right)$	(cont'd)
35	-13 -183	14 1	=	" -c ₂ 115	=	
40	-A 3 -B 1	-Br -Br	- - -	-c ₂ H ₅ "	# 7	
45	-A 1 -A 2	Br -II	=	=	: ::	
50	<u>د</u>	-c ₂ H ₅ -Br	=	=	# 1	
	Example No.	359	360	361	362	

5	((xx): 1 (x) ((xx): 1 (x) ((xx): 1 (x) ((x): 1 (x) ((x	835	835
10			
	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	2	Ξ
20	(n) H ₃ C		
25	Cll 3	Ξ	=
30	∓ ₃	=	. =
	. # I ^B	=	z
35	- i = i	=	. =
	-SCN	=	2
40		=	=
_	- F	=	=
45	-c ₂ u ₅	-C ₃ H ₇ (n)	-C4H9(n)
50	Example No. 363	364	365

Claims

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1. An optical recording medium comprising a support having provided thereon a recording layer containing a naphtholactam dye represented by formula (I):

$$R - N = C + CH = CH + K Z - (I)$$

wherein K represents a substituted or unsubstituted aromatic amine residue; R represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted alkyl group; Z- represents an anion; ring A represents a substituted or unsubstituted naphthalene ring; and m represents 1 or 2.

2. An optical recording medium as in claim 1, wherein said naphtholactam dye is a compound represented by formula (II):

30
$$R^{1} - N = C + CH = CH \rightarrow M$$

$$R^{3} \cdot Z^{-} (II)$$
35
$$R^{4} = R^{5}$$

wherein X and Y each represents a hydrogen atom, a halogen atom, an alkyl group, an acylamino group, or an alkoxy group; R¹ represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted alkyl group having up to 20 carbon atoms, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkyl group having up to 20 carbon or unsubstituted cycloalkyl group; R⁴ and R⁵ each represents a hydrogen atom, a halogen atom, a cyano group, a thiocyanate group, an alkyl group having up to 10 carbon atoms, an alkoxy group having up to 10 carbon atoms, an alkylamino group, an acylamino group, an amino group, or a hydroxyl group; Z-

3. An optical recording medium as in claim 1, wherein said naphtholactam dye is a compound represented by formula (III):

$$R^{1} - N = C + CH = CH + R^{2}$$

$$R^{3} \cdot Z^{-} \quad (III)$$

wherein X represents a hydrogen atom or a methyl group; R¹ represents an alkyl group having up to 8 carbon atoms, an alkoxyalkyl group, an allyloxyalkyl group, an allyl group, or a hydroxyalkyl group; R² and R² each represents an alkyl group having up to 8 carbon atoms, an alkoxyalkyl group, an alkoxyalkyl group, an alkoxyalkyl group, an allyl group, a hydroxyalkyl group, or a halogenoalkyl group; R⁴ represents a hydrogen atom, a halogen atom, or a thiocyanate group; Z⁻ represents an anion; and m represents 1 or 2.

4. An optical recording medium as in claim 1, 2 or 3, wherein the anion as represented by Z⁻ is I⁻, Br., Cl⁻, ClO₄⁻, BF₄⁻, SCN⁻, PF₅⁻, SiF₅⁻, TiF₅⁻,

25

30

$$(R^6)_n$$
 $(R^6)_n$
 $(R^6)_n$

35

 R^6

, wherein R⁶, which may be the same or different when multiple R⁶s are substituted, represents a hydrogen atom, an alkyl group having up to 6 carbon atoms, a halogen atom, or a dialkyl amino group; and n represents 0 or an integer of from 1 to 3.

5. An optical recording medium as in claim 3, wherein R¹ is an alkyl group having up to 5 carbon atoms, an alkyl group having up to 5 carbon atoms which is substituted with an alkoxy group having up to 4 carbon atoms, an allyloxy group, or a hydroxyl group, or an allyl group.

6. An optical recording medium as in claim 3, wherein R² and R³ each is an alkyl group having up to 8 carbon atoms, an alkyl group having up to 8 carbon atoms which is substituted with an alkoxy group having up to 4 carbon atoms, an alkoxyalkoxy group having up to 4 carbon atoms, an allyloxy group, a hydroxyl group, or a halogen atom, or an allyl group.

7. An optical recording material as in claim 3, wherein R⁴ is a hydrogen atom, a chlorine atom, a bromine atom, or a thiocyanato group.

8. An optical recording medium as in claim 1, 2 or 3, wherein Z⁻ is I⁻, Br⁻, Cl⁻, ClO₄⁻, BF₄⁻, SCN⁻, PF₆⁻, SiF₆⁻ or TiF₆⁻.

9. An optical recording medium as in claim 1, 2 or 3, wherein Z" is

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0 224 261

wherein R^{ϵ} is a hydrogen atom, or an alkyl group having up to 4 carbon atoms.

10. An optical recording medium as in claim 1, 2 or 3, wherein Z^- is

wherein R⁴, which may be the same or different when multiple R⁴s are substituted, represents a hydrogen atom, an alkyl group having up to 4 carbon atoms, a chlorine atom, or a dialkyl group having up to 4 carbon atoms; and n represents 0 or an integer of from 1 to 3.

11. An optical recording medium as in claim 10, wherein Z⁻ is